Application No. 09/830,907
Filed: June 19, 2001
TC Art Unit: 1754
Confirmation No.: 5302

REMARKS

Claims 1-8, 10-16, and 20-24 are pending. Claim 1 is amended herein. New claims 22-24 have been added.

Claim 1 has been amended to clarify the feature that the extrudate comprises pores and a total pore volume per unit mass, as determined by mercury porosimetry, wherein at least 0.05 ml/g of said total pore volume per unit mass is in pores of diameter over 1000 nm. Support for this amendment exists in original claim 1, as well as at page 2, lines 15-19, and at page 3, lines 1-6.

New claim 22, depending from claim 1, claims embodiments of the invention wherein the fraction of the total pore volume attributable to pores of diameter over 1000 nm is greater than 4%, which is supported at page 3, lines 7-9.

New claim 23, depending from claim 4, claims embodiments of the invention wherein the total pore volume per unit mass is between 0.5 ml/g and 0.75 ml/g and the fraction of the total pore volume attributable to pores of diameter over 1000 nm is greater than about 7%. This claim is supported in the specification at page 2, lines 15-19, wherein at least 0.05 ml/g is attributable to pores over 1000 nm. Placing this 0.05 ml/g in ratio to the range of total pore volume of 0.5-0.75 ml/g recited in claim 4 produces 10% and about 7%, respectively, such that the minimum fraction of

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the total pore volume attributable to pores of diameter over 1000 nm is greater than about 7%.

New claim 24 is a combination of claims 1 and 4 presented as an independent claim.

No new matter has been added in the amendment or in the new claims.

Amendments to the claims should not be construed as acquiescence to any of the Examiner's rejections, being offered solely to expedite the prosecution of the application. Applicants reserve the right to pursue the claims as originally filed in this or a separate application(s).

Claim Rejections - 35 U.S.C. §112

The Examiner has rejected claims 1-8, 10-16, and 20-21 for the reason that the Examiner did not find support in the Applicant's original disclosure for the recitation in claim 1 as previously amended, namely "at least 10% of the total pore volume in pores of diameter over 1000 nm." Applicant respectfully submits that this rejection has been overcome by the current amendment to claim 1 herein, in which the phrase "at least 10% of" has been struck. Applicant expressly reserves the right to renew claim to the embodiments of the invention described by this

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recitation and/or to traverse this rejection in a future amendment or upon later appeal, particularly in view of the Example disclosing just such an embodiment.

Claim Rejections - 35 U.S.C. §103

Claims 1-8, 10-16 and 20-21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mulaskey et al. (U.S. Patent 3,673,079) in view of Neel et al. (U.S. Patent 4,554,268). The Examiner has asserted that Mulaskey et al. discloses

> "pores above 1000 Angstroms (see column 5, lines 57-59) and a pore volume of 0.25-0.4 cc/g (see column 5, lines 53-54), which would obviously, to one of ordinary skill, at least suggest 10% of pore volume in pores of diameter over 1000 nm." (O.A., page 3, following paragraph numbered 3)

and further

> "Regarding the newly added recitation, Mulaskey '079 discloses pores above 1000 Angstroms (see column 5, lines 57-59) and a pore volume of 0.25-0.4 cc/g (see column 5, lines 53-54), and Neel discloses a pore volume of at least 0.5 ml/g (see column 2, lines 3-6), a surface area above 300 m2/g, either or both of which would obviously, to one of ordinary skill, at least suggest 10% of pore volume in pores of diameter over 1000 nm." (O.A., page 4, second paragraph)

Applicant respectfully requests that the Examiner withdraw the rejection in light of the amendments to claim 1 herein and the reasons presented below.

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Applicant has removed from claim 1, as currently amended herein, the recited phrase regarding "[...] 10% of the total pore volume [...]." Claim 1 as amended now recites, *inter alia*, "A star shaped alumina extrudate comprising pores and a total pore volume per unit mass, as determined by mercury porosimetry, wherein at least 0.05 ml/g of said total pore volume per unit mass is in pores of diameter over 1000 nm, [...]." This feature underlined is not taught or suggested by Mulaskey and/or Neel, by either reference separately or in combination.

Mulaskey teaches away from Applicant's invention as claimed. Furthermore, Mulaskey teaches exactly opposite to the suggestion that the Examiner attempts to construct from this reference.

Mulaskey teaches, at column 5, lines 53-59:

> " ... low pore volume (0.25-0.4 cc/g) and with a narrow pore size distribution, e.g., predominantly micropores with diameters in the range below 1,000 Angstrom units with less than 10 percent of the pore volume being attributable to macropores having diameters above 1,000 Angstrom units. (emphasis supplied)

By straightforward computation, 10 percent of 0.4 cc/g is the uppermost limit that Mulaskey teaches for that portion of the total pore volume per unit mass of a catalytic particle that is attributable to macropores having diameters above 1,000 Angstrom units. That limit, therefore, is 0.04 cc/g, which is equivalent to 0.04 ml/g. Thus, Mulaskey teaches that, at most, less than

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0.04 ml/g of the total pore volume per unit mass in the catalyst particles is attributable to macropores having diameters greater than 1,000 Angstrom units, i.e., 100 nm. To the contrary, Applicant claims at least 0.05 ml/g of said total pore volume per unit mass in Applicant's extrudant is attributable to macropores having diameters greater than 1000 nm (i.e., 10,000 Angstrom units). Therefore, Mulaskey necessarily teaches that that portion of the pore volume per unit mass owing to macropores having diameter greater than 1000 nm is to be less than 0.04 ml/g, while Applicant claims greater than or equal to 0.05 ml/g. The lower limit in Applicant's claim is 25% larger than the upper limit taught by Mulaskey. Actually, Mulaskey teaches that less than 0.04 ml/g is in pores larger than 100 nm. Given the usual pore size distribution in alumina known to one skilled in the art, this means that essentially no pores larger than 1000 nm will be present in Mulaskey. This difference is a significant and important aspect of Applicant's invention as claimed.

As clearly disclosed in Applicant's specification, the feature that the pore volume in pores of over 1000 nm be at least 0.05 ml/g (page 2, lines 17-18) and form a substantial portion of the total pore volume (page 3, lines 4-6) is an important requirement and one that provides significant improvement in

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industrial utility. Such an alumina extrudate has "good properties in terms of reactant accessibility, which makes it suitable for all kinds of catalytic reactions requiring good diffusion of reactants and products through the alumina, thereby eliminating diffusion limitation problems as much as possible." (page 2, lines 9-14). Also, "[i]n view of activity and selectivity it is highly desirable to have an alumina product that is on the one hand highly porous, i.e. having a large volume in large pores, and that has a good mechanical strength and stability." (page 1, lines 23-28).

Neel is silent as to pore volume per unit mass in the disclosed modified refractory oxides.

Therefore, the references cited by the Examiner, even in combination, fail to teach or suggest all of the limitations claimed in Applicant's claim 1 as currently amended. The Applicant respectfully urges that the rejections must be withdrawn as to claim 1. Additionally, Applicants respectfully requests reconsideration and withdrawal of the foregoing rejections to the all the claims depending directly or indirectly from allowable claim 1.

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SUMMARY

Claim 1 has been amended herein. New claims 22-24 have been added. Claims 1-8, 10-16, and 20-24 are pending. Entry of the amendments, withdrawal of all the rejections and allowance of the application with all pending claims are respectfully requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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